In the third lecture Dr. Waller sets forth further interesting facts relating to the mode of action of carbonic acid gas, and compares it with the effects of repeated stimulation, drawing certain inferences as to the agency of this body in producing fatigue, which it would be out of place to criticise here.

The fifth and sixth lectures are devoted to the elucidation of certain changes in the electromotive properties of living nerve, to which half a century ago du Bois-Reymond applied the term electrotonus. Using the method of observing and recording the responses to periodical automatic stimulations already referred to, Dr. Waller demonstrates du Bois' extrapolar electrotonic currents in such a way as to enable the audience to judge of their correspondence with phenomena of the same kind observed in "core models" (*i e.* cylindrical conductors of which the cores are metallic, the sheaths soaked with solutions of electrolytes), and finally proves, as before, with the aid of ether vapour, that although these phenomena resemble those of physical polarisation so closely, they are, notwithstanding, dependent on a vital activity which the nerve loses and recovers again when for a few minutes put to sleep by the anæsthetic. In the last lecture Dr. Waller goes into the rather more recondite phenomena of "polarisation increment and decrement." His mode of exposition of this subject is so original that one begins to fear that he is about to demolish the interpretation of these phenomena which has been given by his distinguished predecessors in this field of investigation. Happily it is not so. When the time comes for explaining, the instructed reader is gratified to find that although the terms employed are peculiar and unusual, there is nothing abnormal about the doctrine. "Active tissue is zincative, resting tissue is zincable." Consequently in a living nerve through a certain bit of which a battery current is flowing, the anode is more zincable than the kathode; for the living substance of the nerve is at rest at the anode, awake at the kathode. But what does zincable mean? It is a word which Dr. Waller proposes to introduce into scientific terminology because he cannot find an English equivalent for the German "leistungsfähig." Regarding the "Leistung" of a nerve to be chiefly electrical, its "Leistungsfähigkeit" is its "capability of being aroused to electromotive action" (p. 83)—a property which he emphatically distinguishes from "excitability," rightly holding that this word ought only to be used to denote the facility with which a response is evoked.

Dr. Waller's explanation of the increment and decrement is that the diminished excitability which is the well-known effect of the anode during the flow of a voltaic current along a nerve, is necessarily associated with what he calls increased zincability. Hence if the nerve passes from the electrotonic into the excited state, those parts which are most zincable are most susceptible of excitatory change. The point which is thus enforced —that is, the association of increased capability with diminished promptitude to reaction—is a fundamental one in the physiology of all excitable tissues. There can be no doubt that in relation to the phenomena now in question, it has been brought out in a more striking way than before by Dr. Waller's excellent forms of experiment, his lucid description, and the admirable diagrams which make those descriptions easy to follow.

J. B. S.

NOTES OF A NATURALIST AND ANTIQUARY.

Memories of the Months; being pages from the Notebook of a Field Naturalist and Antiquary, to wit, Sir Herbert Maxwell, Bart., M.P. Crown 8vo. Pp. xii + 300. (London: Edward Arnold, 1897.)

THE competitive exactions of business and social pleasure have their reaction. An increasing number of people are turning with interest to the study of natural history, and are willing to learn from those who can write about it. This is a hopeful sign to those who believe that the social health and physical standard of the nation depend in large measure on affection for country life, and that it would be an evil thing should field and flood cease to afford attractions for active minds. As Sir Herbert Maxwell truly remarks, no head is constructed to carry about an explanation of half the things noticed in the course of a single morning's walk; but if notes are made at the moment of what attracts the eye, be it a landscape, a ruin, a battle-field, a flower, bird, or insect, recourse may be had at home to the information abundantly stored in books, and the significance of what seemed commonplace or trivial becomes evident at once. Without attempting to become a specialist himself, every one has at command the accumulated fruits of the labours of specialists.

Acting upon this conviction, it would appear that Sir Herbert Maxwell has long been in the habit of making wayside notes on a variety of subjects, and from time to time has amplified and published them for the benefit of others.

His method of presenting them to the reader is not very new, as will be perceived by those who are acquainted with the Rev. Robert Willmott's "Summer Time in the Country," Mr. Oswald Crawfurd's "Round the Calendar in Portugal," Prof. Miall's "Round the Year," and other books of a similar nature; and it might, perhaps, have been better to have arranged his miscellaneous and fragmentary notes under zoological, botanical, and antiquarian headings, instead of grouping them, as he has done, under the headings of the months to which more often than not they have no particular relation. This plan would have been more convenient to specialists as affording them the opportunity of at once finding all that relates to their own subject, instead of having to search for scattered notes through three hundred pages.

No one, however, who dips into this little volume will begrudge the time bestowed upon it, for whether he be in search of particular information on a given subject or not, he will perforce linger upon many a page wherein he will find both amusement and instruction.

What more amusing, for example, than the author's account (pp. 259-266), of the attempts made to decipher the inscription on the celebrated Ruthwell Cross, variously interpreted—and by experts too—as Runic

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Old Norse, and Anglo-Saxon; or his explanation (p. 184) of the reason for keeping cattle in herds.

For instruction we may turn to such chapters as those on the "Revival of a primitive fauna," on "West coast meteorology," or on "Assisted vision." Some of the pleasantest reading is to be found in the pages which give the results of the author's out-of-door observation. Here, for example, is a note on the enmity between bees and butterflies:—

> "All kinds of stonecrop possess peculiar attractions for bees and butterflies owing to their abundant secretion of honey. One of the tall growing kinds, *Sedum spectabile*, is by far the handsomest. It is the latest to flower, and its great, flat, rosy corymbs are irresistible to that splendid autumn butterfly, the Red Admiral. . . . I have been watching a number of these robust insects busy on the large stonecrop—so busy as to allow me to use a lens on them. There were no less than sixteen Admirals at work on one group of *Spectabile* stonecrop. The honey bees, however, interfered with them, and it was curious to see how shrewdly a Red Admiral would sheer off at the approach of a bee of less than one-tenth of his own bulk. . . . Now, how do butterflies learn to dread a bee? How do they know that bees are armed? It can hardly be by experience, for no butterfly could survive the stab of a bee's sting. It is part of the mystery enveloping the intelligence of animals not personally educated by their parents. . . . The phases of insect life—the egg abandoned by the parent, the stages of larva, pupa, and imago—seem specially calculated to interfere with hereditary knowledge, and to prohibit the communication of instruction. . . . This avoidance of bees by butterflies seems to be an instance of pure instinct."

On another page, in the course of some remarks on the choice of food by animals, the author alludes to the fact that some creatures will thrive upon plants which to others are poisonous, and instances the case of the Spurge Hawk Moth (*Deiliphila euphorbiæ*), of which the caterpillar feeds exclusively on the Sea Spurge, although this plant secretes an acrid juice "so painfully poisonous that it is difficult to imagine a digestive apparatus competent to deal with it." He might have mentioned the still more curious case of the caterpillar of another moth, *Deiopeia pulchella*, which feeds on the virulent poison contained in the seed of the Esere or "Ordeal Bean" of Old Calabar (*Physostigma venenosum*), and is unaffected by it (*cf.* Dr. T. R. Fraser, *Ann. Mag. Nat. Hist.*, May 1864).

We should like to know the authority for the statement (p. 141) that in the lines from the "Midsummer Night's Dream" (So doth the woodbine the sweet honeysuckle gently entwist), Woodbine means the Bittersweet or Deadly Nightshade. This interpretation appears to have the sanction of Dr. Prior in his "Popular Names of British Plants," but is opposed to the view of Canon Ellacombe, who has made a special study of the "Plant-lore of Shakespeare."

We have noted other passages on which criticism might be offered did space permit; but enough has perhaps been said to indicate the scope of the volume. While too much in the nature of a scrap-book to entitle it to praise as a literary effort, it has the merit of being distinctly entertaining, and of conveying in a light, pleasant style a variety of information on subjects of more or less interest.

OUR BOOK SHELF.

Notes on Micro-organisms Pathogenic to Man. By Surgeon-Captain B. H. S. Leumann, Indian Medical Service. Pp. 96. (London: Longmans, Green, and Co., 1897.)

THIS compact and well-written little volume does not make any pretensions to be a text-book in the ordinary sense of the word, and we should be sorry if the "students and practitioners" for whom it is intended should in their turn make any pretensions to a knowledge of the subject after its perusal. Indeed, students and practitioners "who have no opportunity of working at the subject themselves, or time to read a larger book," had better remember the old adage, a little learning is a dangerous thing. Bacteriology, unfortunately, suffers at the present time from the idea that it is essentially a popular science—that it is a subject well within the comprehension and well within the grasp of any one who chooses to hold out his hand for it. Thus we too frequently find it taken up by totally unqualified persons, and the results of their recondite researches serve to bring the whole domain of microbes into disrepute. We do not quarrel with Surgeon-Captain Leumann's little book, for it is clearly and concisely written, and makes every endeavour to be accurate and up to date; and of particular interest is the local colouring, if we may use such an expression, which characterises it in dealing with the most recent work in India on plague and cholera. We have no desire to depreciate these notes, but we do regret that the author encourages the practice of reading about bacteria instead of working at them in a class of professional men who ought certainly to be able to do something more substantial than talk about them. Bacteriology to be of any value must be studied in the laboratory; and without a practical acquaintance with micro-organisms, the latest and most exhaustive manual "made in Germany" will fail to do more than acquaint the reader with the superficial phraseology of the subject.

The Winter Meteorology of Egypt and its Influence on Disease. By H. E. Leigh Canney, M.D. (Lond.), &c. Pp. 72. (London: Ballière, Tindall, and Cox, 1897.)

TO people who, for health's sake, pass the winter in Egypt, and to practitioners who wish to know the climatic conditions of the various health resorts of the country, this book will be an invaluable possession. The volume comprises a paper read before the Royal Meteorological Society last December, and one read before the recent International Congress of Medicine at Moscow. The first of these papers contains the results of a series of meteorological observations made under precisely comparable conditions during three or four winters in Egypt. The stations at which observations were made were Cairo, Mena Honse, Helouan, Luxor, Assouan, Valley of the Tomb of the Kings, and the crest of the Libyan Hills. As self-recording thermometers and hair-hygrometers were used at each station, valuable data were obtained on the diurnal variation of temperature and humidity. It appears from the discussion of the observations that the climate of Egypt is influenced by the Libyan or Western Desert, the Mediterranean Sea, and the extent of cultivated land.

The second part of the treatise provides the medical profession with a valuable guide to the therapeutic influences of the climates of different health stations in Egypt. Practitioners who have not been able to visit the country will find this section most serviceable.

Appended to the volume are several clear and instructive diagrams showing, for the six months from November 1895 to April 1896, the temperature and relative humidity at various hours of the day at Helouan, Mena Honse,

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